Fibers of tension.—JACCARD[27] has investigated anew the already frequently studied differences in the structure and composition of the wood on the upper and lower sides of dorsiventral branches of dicotyledonous trees, along with the stimuli producing these differences. In the upper side of such branches he frequently finds what he has termed "wood of tension" and "fibers of tension," while in the lower side he finds "wood of compression" and "fibers of compression." The fibers of tension are produced by the tension stimulus acting upon the cambium region. This stimulus may result from the weight of the branch or from bending due to other causes, as negative geotropism or torsion. Hence the fibers may occasionally appear on the lower side of the branch or even on vertical branches. They can also be produced by the mechanical bending of upright stems. The duration and intensity of the stimuli are important as in tropisms. There is also a summation of stimuli as in tropisms. He speaks of the formation of tension fibers as a purely physiological response, which has no hereditary or phylogenetic significance.

The wood of tension differs from the wood of compression in the following ways: more compact grouping of wood fibers with a corresponding reduction of vessels; more considerable development of medullary rays with their reserves; more regular grouping of the wood fibers; longer fibers with smaller lumina. The microchemical study indicates that the fibers of tension are made up of a combination of hemicellulose, pectin, and lignin. Fibers of tension are more general in summer than in autumn wood. Of the indigenous trees of France, *Tilia* only lacked fibers of tension, and of the introduced forms *Liriodendron Tulipifera* lacked them. *Rhus typhina* lacked while *R. cotinus* bore them. They are generally absent in such shrubs as *Lonicera*, *Ribes*, *Ligustrum*, *Viburnum*, and *Corylus*.—WM. CROCKER.

Ecological anatomy of leaves.—The variations in transpiration and in structure exhibited by the leaves of various forest trees have been studied by HANSON,[28] using material from isolated trees growing in the open. Light, evaporating power of the air, temperature, humidity, and wind velocity were measured at the south periphery and at the center of the crown of the same tree, the transpiration of leaves from these two positions determined by the use of potometers, the dry and green weights of equal leaf areas obtained, and finally leaves from the two situations were compared as to structure as exhibited, in cross-sections. All the environmental factors showed wide differences, which may be illustrated by taking those obtaining within and without the branches of *Acer saccharum*, one of the 10 tree species studied. Here the conditions within the crown compared with those at its south periphery were for

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[27] JACCARD, P., Bois de tension et bois de compression dans les branches doriventrales des feuilles. Rev. Gen. Bot. **19**:225–242. 1917.

[28] HANSON, HERBERT C., Leaf structure as related to environment. Amer. Jour. Bot. **4**:533–560. *figs. 21*. 1917.

light intensity 1.75:100; evaporating power of the air 1:2.3; humidity up to 100:84; wind velocity 1:2.2; and temperature from 1° to 2° C. higher at the latter position. Green and dry weights of leaves in the center of the crown were 46 and 38 per cent respectively of equal areas at the south periphery, while cross-sections showed differences of structure as great as those of weight, the average thickness of the centrally placed leaves being only 38 per cent of those at the periphery. The other species studied showed variations quite as interesting as those cited, the loss of water by transpiration showing a range of 3–12 times as much from leaves upon the south periphery as from equal leaf areas within the crown.

The investigation is particularly important in opening up a field of promising and almost unlimited possibilities in the study of structural response of aërial organs to measured variations in external factors.—GEO. D. FULLER.

Vegetation of Dutch Guinea.—Miss GIBBS[29] has added to her contributions to our knowledge of little known floras by exploring portions of the mountainous parts of Dutch N.W. New Guinea. The plant formations receiving most attention were the low mountain forest above 7000 ft., in which the dominant trees were *Quercus Lauterbachii*, *Podocarpus Rumphii*, *P. papuanus*, and *Phyllocladus hypophyllus*. These attained a height of some 16 m., with plenty of lianas, among which such ferns as *Gleichenia linearis*, *Nephrolepis acuminata*, and *Polybotrya arfakensis* were conspicuous. There were transitions to a mossy forest in which to the preceding trees there were added, among others, *Dacrydium novo-guineense* and *Librocedrus arfakensis*, making a remarkable aggregate of conifers, together with *Drimys arfakensis* and several Myrtaceae. Here a rich undergrowth of mosses, ferns, and herbaceous plants combined with an abundance of many epiphytic ferns and orchids. Locally in marshy localities there were found pure stands of the endemic *Araucaria Beccarii*. With increasing altitude the mossy forest decreased in height, although many of the same tree species persisted, with the addition of species of *Rhododendron* and several other ericaceous shrubs, as the mountain crest of 9000 ft. was reached. Here the trees were low and scrubby, the stand more open, and the growth of undershrubs more dense.

Miss GIBBS has recorded many interesting incidents of her trip and described less minutely other plant associations, but declares that she saw no forest that answered to the description of rain forest. Her collections showed 330 species, of which 100 were hitherto unknown; they included in addition 5 new genera.—GEO. D. FULLER.

Verbascum hybrids.—It has long been known that many hybrids occur in the genus *Verbascum*. FOCKE, SCHIFFNER, and others have made observations

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[29] GIBBS, LILIAN S., A contribution to the phytogeography and flora of the Arfak Mountains, etc. Dutch N.W. New Guinea. 8vo. pp. iv+226. *pls. 4. figs. 16.* London: Taylor and Francis. 1917. 12/6.